

HabEx Workhorse Camera (HWC)

- philosophy:
 - general purpose UVOIR imager + low-/moderate-resolution spectrometer
 - primary usage will be follow-up, not survey work (i.e., ~4 arcmin FoV)
 - even in age of ELT's, space-based, diffraction-limited UVOIR imaging and spectroscopy on a space-based platform will be unique and compelling
 - UV cannot be done from the ground
 - ELT AO performance will primarily be significantly degraded below 1 micron; also space-based platform is more stable for programs where systematics are key (i.e., observational cosmology)
 - in near-IR, space buys access to certain bands not accessible from the ground
 - strong goal to allow parallel observations with exoplanet instrument(s)
 - the overwhelming majority of Hubble GO programs make use of similar capabilities, with remaining time for high-resolution UV spectroscopy
- started Team X instrument design study at JPL in late October
- currently iterating on the initial results of that study

GO Instrument Usage

Configuration	Mode	Prime %	Coordinated Parallel %	Total	Instrument Prime Usage	Instrument Prime + Coordinated Parallel Usage	Pure Parallel Usage	Snap Usage
ACS/SBC	Imaging	1.2%	0.0%	1.0%			0.0%	0.0%
ACS/SBC	Spectroscopy	0.1%	0.0%	0.1%			0.0%	0.0%
ACS/WFC	Imaging	12.5%	42.5%	16.1%			0.0%	16.0%
ACS/WFC	Ramp Filter	0.2%	0.0%	0.2%	13.9%	17.4%	0.0%	0.0%
ACS/WFC	Spectroscopy	0.0%	0.0%	0.0%			0.0%	0.0%
COS/FUV	Spectroscopy	18.6%	0.0%	16.3%			0.0%	6.0%
COS/NUV	Imaging	0.0%	0.0%	0.0%	20.5%	18.0%	0.0%	0.0%
COS/NUV	Spectroscopy	1.9%	0.0%	1.7%			0.0%	0.0%
FGS	POS	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
FGS	TRANS	0.0%	0.0%	0.0%			0.0%	0.0%
STIS/CCD	Imaging	0.8%	0.0%	0.7%			0.0%	0.0%
STIS/CCD	Spectroscopy	8.9%	0.0%	7.8%			0.0%	6.0%
STIS/FUV	Imaging	3.3%	0.0%	2.9%	27.6%	24.3%	0.0%	0.0%
STIS/FUV	Spectroscopy	7.4%	0.0%	6.5%			0.0%	0.0%
STIS/NUV	Imaging	0.0%	0.0%	0.0%			0.0%	0.0%
STIS/NUV	Spectroscopy	7.3%	0.0%	6.4%			0.0%	0.0%
WFC3/IR	Imaging	11.0%	13.5%	11.3%			40.0%	43.0%
WFC3/IR	Spectroscopy	8.3%	0.0%	7.3%	37.9%	40.3%	23.0%	0.0%
WFC3/UVIS	Imaging	18.4%	44.0%	21.5%			37.0%	29.0%
WFC3/UVIS	Spectroscopy	0.1%	0.0%	0.1%			0.0%	0.0%
		100%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

8/31/16

Results from Cycle 24 Peer Review

- GO instrument usage for Hubble, Cycle 24
- approximately ~80% of Hubble usage is for an HWC-like instrument; remaining ~20% for a high-resolution UV spectrometer

HabEx Workhorse Camera

- progression of WFC3 on Hubble:
 - arm #1: UV/optical, with UV-sensitive CCD detectors
 - arm #2: near-IR band to ~ 2 μm , with H4RG HgCdTe detectors
 - diffraction limited starting at ~ 400 nm
 - imaging + spectroscopy capabilities on both arms
 - micro-shutter array for multi-object slit spectroscopy (planning for a single array for both arms, early in light path)
 - should be a very high TRL instrument, with cost similar to Hubble instruments
- similar to High-Definition Imager (HDI), which is the 3rd instrument on LUVOIR (#1 = coronagraph; #2 = LUMOS \sim HabEx's UV spectrograph; #4 = OIR high-resolution spectrograph, which HabEx doesn't have an analog to)

HWC Science

- large discovery potential for such an instrument; below are just a few potential programs:
 - precision Hubble constant with distant type Ia supernovae
 - resolved stellar populations in relatively local Universe, including dwarf galaxies
 - UV plumes from Europa